

fluoropolymers, polyacrylates, polyurethanes, co-polyetheresters, and co-polyetheramides.

[33]22. The combination of claim [32]21, wherein the functional layer (5) is made from expanded PTFE.

[34]23. The combination of claim 1, wherein the MVTR of the laminate (400) is less than 150 RET.

[35]24. The combination of claim 1, wherein the water entry pressure of a laminate (400) is greater than 0.13 bar.

[36]25. Articles of clothing made from the combination of claim 1.

[37]26. A combination of two laminates (400, 450, 650) joined together at a waterproof seam (500), each of the laminates (400, 450, 650) comprises:  
a first layer (5) comprising a waterproof functional layer (10, 20), and  
a second layer (30) laminated to said first layer (5) and comprising at least a first component and a second component, the first component being stable to a first temperature and the second component melting at a second temperature wherein the first temperature is higher than the second temperature, and wherein the second component has been heated and melted to form the waterproof seam between the two laminates.

[39]28. The combination of claim [37]26, whereby the seam (500) withstands a water entry pressure of at least 0.13 bar.

[40]29. The combination of claim [37]26, whereby the seam (500) has a width less than 0.25 cm.

[41]30. The combination of claim [37]26, whereby the seam (500) has an elongation strain at break of greater than 75%.

[42]31. The combination of claim [37]26, whereby the seam (500) has a transverse seam strength of greater than 3 pli.

[43]32. The combination of claim [37]26, whereby the stiffness of the seam (500) is less than 50 mm<sup>-1</sup>.

[44]33. The combination of claim [37]26, whereby the shrinkage of the seam (500) is less than 7%.

[45]34. The combination of claim [37]26, whereby the second layer further includes a propellant which is activatable by activation means.

[46]35. The combination of claim [37]26, whereby the second component melts at a temperature in the range of from 80° C to 170° C.

[47]36. The combination of claim [37]26, whereby the first component does not melt below a temperature of 140° C.

[48]37. The combination of claim [37]26, whereby the difference in temperature between the first temperature and the second temperature is at least 20°C.

[49]38. The combination of claim [37]26, wherein the second layer (30) is composed of a plurality of yarns in the form of strands, filaments threads or fibers.

[50]39. The combination of claim [37]26, wherein the first component is selected from the group of polymers comprising cellulose, protein fibers, polyolefins, polyester, co-polyester, polyamide, and co-polyamide.

[51]40. The combination of claim [50]39, wherein the first component is polyamide 6.6.

[52]41. The combination of claim [37]26, wherein the second components is a thermoplastic.

[53]42. The combination of claim [52]41, wherein the second component is selected from the group of thermoplastics comprising co-polyester, polyamide, co-polyamide and polyolefin.

[54]43. The combination of claim [53]42, wherein the second component is a polyethylene.

- [55]44. The combination of claim [53]42, wherein the second component is a polyamide 6.
- [56]45. The combination of claim [49]38, wherein the yarn has a bicomponent structure comprising the first component and the second component.
- [57]46. The combination of claim [56]45, wherein the yarn has a sheath-core structure, wherein the second component forms the cover.
- [58]47. The combination of claim [56]45, wherein the yarn has a "side-by-side" structure.
- [59]48. The combination of claim [37]26, wherein the second layer is composed of a plurality of yarns in the form selected from strands, filaments, threads, and fibers.
- [60]49. The combination of claim [59]48, wherein the yarn is comprised of fibers.
- [61]50. The combination of claim [45]34, wherein the propellant after activation generated a closed cell foam with the second component after melting.
- [62]51. The combination of claim [45]34, wherein the propellant is activated at a temperature [intermediate] between the second temperature and the first temperature.
- [63]52. The combination of claim [45]34, wherein the propellant is an integral part of the second component.
- [64]53. The combination of claim [45]34, wherein the propellant is selected from the group of propellants consisting of azodicarbonamide, ammonium hydrogen carbonate, toluolsulfohydrazin or diazoaminobenzol.
- [65]54. The combination of claim [64]53, wherein the propellant is azodicarbonamide.
- [66]55. The combination of claim [37]26, wherein the functional layer (5) is a membrane or a film.

[67]56. The combination of claim [66]55, wherein the functional layer (5) is selected from the group of materials consisting of polyesters, polyamide, polyolefins, polyvinylchloride, polyketones, polysulfones, polycarbonates, fluoropolymers, polyacrylates, polyurethanes, co-polyetheresters, and co-polyetheramides.

[68]57. The combination of claim [67]56, wherein the functional layer (5) is made from expanded PTFE.

[69]58. The combination of claim [37]26, wherein the MVTR of the laminate (1) is greater than  $3000 \text{ m}^2/24 \text{ hr}$ .

[70]59. The combination of claim [37]26, wherein the water entry pressure of a laminate (1) is greater than 0.13 bar.

[71]60. The combination of claim [37]26 in a garment.

[72]61. The combination of claim 1 wherein the waterproof substrate comprises at least a [having two] waterproof laminate[s] (400, 450[, 650]), [each] having a functional layer (10, 20) laminated to a textile layer (30), [and being joined together at a welded waterproof seam (500), ]wherein the waterproof seam (500) has a transverse seam strength of greater than 3 pli and an elongation strain at break greater than 75%.

[73]62. The combination of claim [72]61, wherein the seam (500) has a width of less than 0.25 cm.

[74]63. The combination of claim [72]61, wherein the stiffness of the seam (500) is less than  $50 \text{ mm}^{-1}$ .

[75]64. The combination of claim [72]61, wherein the seam (500) withstands water pressure of 0.13 bar for at least three minutes.

[76]65. The combination of claim [72]61, wherein the seam (500) shrinks by less than 7% after welding.

[77]66. The combination of claim 1 wherein the waterproof substrate comprises at least a [having two] waterproof laminate[s] (400, 450[, 650]), [each] having a functional layer (10, 20) laminated to a textile layer (30), [and

being joined together at a welded waterproof seam (500),] wherein the waterproof seam (500) has a transverse seam strength of greater than 3 pli and wherein the stiffness of the seam (500) is less than 50 mm<sup>-1</sup>.

[78]67. The combination of claim [77]66, wherein the seam (500) has a width of less than 0.25 cm.

[79]68. The combination of claim [77]66, wherein elongation strain at break is greater than 75%.

[80]69. The combination of claim [77]66, wherein the seam (500) withstands a water pressure of 0.13 bar for at least three minutes.

[84]73. The combination of claim 17, wherein the second component is selected from the group of thermoplastics comprising co-polyester, polyamide, co-polyamide or polyolefin.

[85]74. The combination of claim [84]73, wherein the second component is a polyethylene.

[86]75. The combination of claim [84]73, wherein the second component is a polyamide 6.

[87]76. The combination of claim 13, wherein the yarn has a bicomponent structure comprising the first component and the second component.

[88]77. The combination of claim [87]76, wherein the yarn has a cover-core structure, wherein the second component forms the cover.

[89]78. The combination of claim [87]76, wherein the yarn has a "side-by-side" structure.

[90]79. The combination of claim 13, wherein the second layer is a blend of said plurality of yarns selected from strands, filaments, threads and fibers.

[91]80. The combination of claim 13, wherein the yarn is comprised of fibers.

[92]81. The combination of claim 9, wherein the propellant after activation generates a closed cell foam with the second component after melting.

- [93]82. The combination of claim 9, wherein the propellant is activated at a temperature [intermediate] between the second temperature and the first temperature.
- [94]83. The combination of claim 9, wherein the propellant is an integral part of the second component.
- [95]84. The combination of claim 1, whereby the first component does not disintegrate below a temperature of 140° C.
- [96]85. The combination of claim [37]26, whereby the first component does not disintegrate below a temperature of 140° C.
- [97]86. The combination of claim 15, wherein the first component is a polyolefin selected from polypropylene and polyethylene.
- [98]87. The combination of claim 15, wherein the first component is a protein fiber selected from wool and silk.
- [99]88. The combination of claim [32]21, wherein the functional layer is polytetrafluoroethylene (PTFE).
- [100]89. The combination of claim [50]39, wherein the first component is a polyolefin selected from polypropylene and polyethylene.
- [101]90. The combination of claim [50]39, wherein the first component is a protein fiber selected from wool and silk.
- [102]91. The combination of claim [52]41, wherein the second component is a polyolefin selected from polypropylene and polyethylene.
- [103]92. The combination of claim [66]55, wherein the functional layer is [1451] polytetrafluoroethylene (PTFE).
- [104]93. The combination of claim [84]73 wherein the second component is a polypropylene.